



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,759	12/19/2001	Johannes Bruijns	NL000731	3989

24737 7590 12/14/2004

PHILIPS INTELLECTUAL PROPERTY & STANDARDS  
P.O. BOX 3001  
BRIARCLIFF MANOR, NY 10510

EXAMINER

AZARIAN, SEYED H

ART UNIT PAPER NUMBER

2625

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/024,759	BRUIJNS, JOHANNES	
	<b>Examiner</b>	<b>Art Unit</b>	
	Seyed Azarian	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### **Specification**

1. The abstract is objected to because it should be in narrative form and generally limited to a "single paragraph" on a separate sheet.

Correction is required.

Deleting "Figure 1" at the bottom of the abstract should be deleted.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(c) BRIEF SUMMARY OF THE INVENTION.

(d) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(e) DETAILED DESCRIPTION OF THE INVENTION.

### ***Claim Objections***

The claim 1 is objected to because they include reference characters, which are not enclosed, as being indefinite. The disclosure is objected to because of the following informalities. Page 4, line 7, definition of voxel discloses the values, (for example 127).

Appropriate correction is required.

### **Claim Rejections - 35 USC § 102**

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-7 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Cheng et al (U.S. patent 6,309,353).

Regarding claim 1, Cheng discloses a system a method of analyzing a data set of an object to be examined, which data set comprises voxels of at least a first type and a second type said method comprising the following steps (see abstract, also column 6, lines 1-9, both types of tumors can be well extracted, by evaluating the surface of the tumors);

a) classifying the voxels as voxels of the first, the second or further types (column 4, lines 32-37, classifying voxel data of the tumor as "tumor", "normal tissue" or "boundary");

b) determining which of the voxels of the first type are boundary voxels that adjoin voxels of the second or further types (column 5, lines 34-47, classified voxel data such as tumor, normal tissue or boundary using the output from the LOG filter, also column 7, lines 56-64 classification of each voxel, the boundary is defined as a normal tissue which is adjacent to the tumor. If a voxel is tumor, it is not adjacent to normal tissue, if a voxel is normal tissue, it is not adjacent to tumor, if a voxel is boundary, it must be adjacent to both of the tumor and normal tissue);

c) assigning a data value to each voxel of the first type, said data value representing a measure of the distance between said voxel and the nearest boundary voxel (column 5, lines 33-46, generates the function for each index such as distance between center of gravity of intensity and morphological center corresponding to histogram of classified voxel data such as tumor or normal tissue or boundary, also column 12, lines 25-33, voxel selecting and value calculating processor voxel which classified as boundary to obtain the average value of intensity and distance);

d) classifying the voxels of the first type that have a distance data value exceeding a predetermined threshold as aberration voxels (column 16, lines 11-18, for judging the tumor as malignant tumor, when  $r$  (calculating parameter) is larger than the threshold, tumor is judged as malignant (aberration voxels), if  $r$  is smaller than the threshold, the tumor is judged as benign).

Regarding claim 2, Cheng discloses a method as claimed in claim 1, also comprising the following steps, e) determining which of the aberration voxels are boundary aberration voxels adjoining voxels of the first type (column 4, lines 53-59, discriminating a degree of surface roughness of a tumor, extracting a boundary between tissues to find breast cancer tissues out of the tissues based on the voxel data, also column 7, lines 56-65, if a voxel is normal tissue, it is not adjacent to tumor, if a voxel is boundary, it must be adjacent to both of the tumor and the normal tissue);

f) adding a number of voxels of the first type that form a shell of a certain thickness to the aberration voxels (column 11, lines 56-67).

Regarding claim 3, Cheng discloses a method as claimed in claim 2, wherein the step f comprises the steps of, f1. assigning a data value to each voxel of the first type, said data value representing a measure of the distance between said voxel and the nearest boundary aberration voxel (column 5, lines 33-46, generates the function for each index such as distance between center of gravity of intensity and morphological center corresponding to histogram of classified voxel data such as tumor or normal tissue or boundary, also column 12, lines 25-33, voxel selecting and value calculating processor voxel which classified as boundary to obtain the average value of intensity and distance);

f2. classifying the voxels of the first type that have a distance data value less than or equal to a predetermined ceiling value as aberration voxels (column 16, lines 11-18, for judging the tumor as malignant tumor, when  $r$  (calculating parameter) is larger

Art Unit: 2625

than the threshold, tumor is judged as malignant (aberration voxels), if  $r$  is smaller than the threshold, the tumor is judged as benign).

Regarding claim 4, Cheng discloses a method as claimed claim 1, also comprising the steps of, determining the sum of all aberration voxels and multiplying the sum of the aberration voxels by the volume of a single voxel so as determine the volume of the aberration (column 7, lines 2-15, the voxel in the darker area has a higher degree for tumor, all the parameter is computed in a volume of  $7 \times 7$  voxel and column 14, lines 13-23, boundary, and having label number calculating process, the number of voxel in the  $3 \times 3$  voxel volume).

Regarding claim 5, Cheng discloses a method as claimed in claim 1, wherein said distance data values are computed by means of a distance transform function (column 12, lines 25-34).

Regarding claim 6, Cheng discloses a method as claimed in claim 1, wherein said threshold and/or ceiling value is set by the user (column 15, lines 26-35, to set parameter  $(r) = 1$  (threshold)).

Regarding claim 7, Hill discloses a method as claimed in claim 1, wherein said threshold and/or ceiling value is computed on the basis of a histogram of distance data values (see claim 1, also column 5, lines 37-47, classified voxel data such as tumor or normal tissue, based on histogram).

Regarding claim 10, Hill discloses a computer program for carrying out the method as claimed in claim 1 (column 9, lines 12-21, DEC pentium, and program for carrying out the 3D-image).

### ***Claim Rejections - 35 U.S.C. § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 8 and 9, are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al (U.S. patent 6,309,353) in view of Aylward et al (U.S. patent 6,690,816).

Regarding claims 8 and 9, Cheng fails to disclose "the potential tubular structure voxel". On the other hand in the same field of medical system, Aylward, teaches image elements of tubular objects between a source image and a destination image and registration of tubular objects (Fig. 18, column 24, lines 27-53).

Therefore it would have been obvious to a person of ordinary skill in the art at time the invention was made, to modify Cheng invention according to the teachings of Aylward because it provides plurality of cross-sections along the tubular object for establishing a seed point corresponding to a tubular object, which can easily be implemented in an X-ray device such as angiography.



### Other prior art cited

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(U.S. patent 6,351,513) to Bani-Hashemi et al is cited for fluoroscopy based 3-D neural navigation based on co-registration of other modalities with 3-D angiography reconstruction data.

(U.S. patent 6,366,800) to Vining et al is cited for automatic analysis in virtual endoscopy.

(U.S. patent 6,674,894) to Parker et al is cited for method and apparatus for enhancing an image using data optimization and segmentation.

(U.S. patent 6,389,104) to Bani-Hashemi et al fluoroscopy based 3-D neural navigation based on 3-D angiography reconstruction data.

(U.S. patent 6,132,376) to Hossack et al is cited for multiple ultrasonic image registration system, method and transducer.

### **Contact Information**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (703) 306-5907. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

Art Unit: 2625

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached at (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.

Status information about the PAIR system, see [http:// pair-direct.uspto.gov](http://pair-direct.uspto.gov). Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Seyed Azarian*  
*Patent Examiner*  
*Group Art Unit 2625*  
December 12, 2004

A handwritten signature in black ink, appearing to read 'Seyed Azarian', written in a cursive style.